Other measurements have been made, and which give results also in accordance with the theory.

It may be well to remark that in order to get a proper fineness of particle in suspension in the water, a very convenient plan is to add the varnish very gently and by very small quantities in a glass jar in which the water is automatically or otherwise stirred. The water should be of large volume to get the best results. To make the fineness still more uniform we have prepared the turbid medium as above, and then rotated the glass flask in which it was placed at the rate of about 2500 revolutions per minute. By this means any particles, except the very finest, are deposited on the sides of the flask, and the filtered liquid—if we may so call it—can be poured off ready for any experiments.

May 20, 1886.

Professor STOKES, D.C.L., President, in the Chair.

The presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "Relation of 'Transfer-resistance' to the Molecular Weight and Chemical Composition of Electrolytes." By G. GORE, LL.D., F.R.S. Received May 5, 1886.

(Abstract.)

In the full paper the author first describes the method he employed for measuring the "resistance," and then gives the numerical results of the measurements in the form of a series of tables.

He took a number of groups of chemically related acids and salts of considerable degrees of purity, all of them in the proportions of their equivalent weights, and dissolved in equal and sufficient quantities of water to form quite dilute solutions. The number of solutions was about seventy, and included those of hydriodic, hydrobromic, hydrochloric, hydrofluoric, nitric, and sulphuric acids; the iodides, bromides, chlorides, fluorides, hydrates, carbonates, nitrates, and sulphates of ammonium, cæsium, rubidium, potassium, sodium, and lithium; the chlorides, hydrates, and nitrates of barium, strontium, and calcium; and a series of stronger solutions, of equivalent strength to each other, of the chlorides of hydrogen, ammonium,

rubidium, potassium, sodium, lithium, barium, strontium, and calcium. A series of similar liquids to those of one of the groups of acids, of equal (not of equivalent) strength to each other, was also included.

As electrodes he employed pairs of plates of zinc, cadmium, lead, tin, iron, nickel, copper, silver, gold, palladium, and platinum; and separate ones formed of small bars of iridium.

He took each group of solutions, and measured in each liquid separately at atmospheric temperature, the "total resistance" at the two electrodes, and the separate "resistances" at the anode and cathode respectively with each metal, and thus obtained about seventy different tables, each containing about thirty-six measurements, including the amounts of "total," "anode," and "cathode resistance" of each metal, and the averages of these for all the metals.

By comparing the numbers thus obtained, and by general logical analysis of the whole of the results, he has arrived at various conclusions, of which the following are the most important:—The phenomenon of "transfer-resistance" appears to be a new physical relation of the atomic weights, attended by inseparable electrolytic and other concomitants (one of which is liberation of heat, "Phil. Mag.," 1886, vol. xxi, p. 130). *In the chemical groups of substances examined, it varied in magnitude inversely as the atomic weights of the constituents, both electropositive and electronegative, of the electrolyte, independently of all other circumstances;* and in consequence of being largely diminished by corrosion of the electrodes it appears to be intimately related to "surface-tension." He suggests that corrosion may be a consequence and not the cause of small "transfer-resistance." The strongest evidence of the existence of the above general law was obtained with liquids and electrodes with which there was the least corrosion and the least formation of undissolved films; those liquids were dilute alkali chlorides, with electrodes of platinum.

The research is an extension of a former one on "Transfer-resistance in Electrolytic and Voltaic Cells," communicated to the Royal Society, March 2, 1885. Further evidence on the same subject has been published by the author in the "Phil. Mag.," 1886, vol. xxi, pp. 130, 145, 249.

II. "A Study of the Thermal Properties of Ethyl Oxide." By WILLIAM RAMSAY, Ph.D., and SYDNEY YOUNG, D.Sc. Received May 5, 1886.

(Abstract.)

A year ago, a paper was communicated to the Society on the behaviour of ethyl alcohol when heated. A similar study of the properties of ether has been made, in which numerical values have